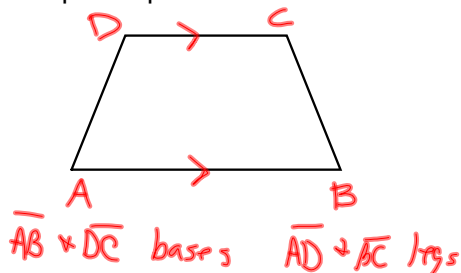
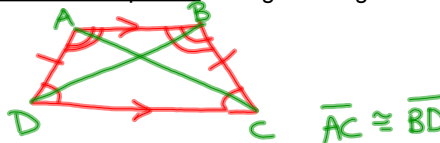


8-5 Use Properties of Trapezoids and Kites

trapezoid--quadrilateral with exactly one pair of parallel sides



isosceles trapezoid-- congruent legs

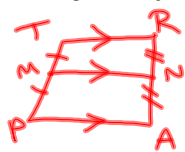


Theorem 8.14--If a trapezoid is isosceles, then each pair of base angles is congruent

Theorem 8.15--If a trapezoid has a pair of congruent base angles, then it is isosceles.

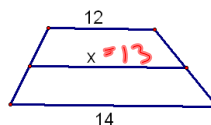
Theorem 8.16--A trapezoid is isosceles iff its diagonals are congruent

Midsegment--joins the midpoints of the legs

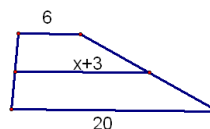


$$MN = \frac{1}{2}(TR + AP)$$

Theorem 8.17--The midsegment of a trapezoid is parallel to the bases and = $\frac{1}{2}$ the sum of the lengths of the bases

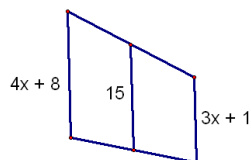


$$x = \frac{1}{2}(12 + 14)$$



$$x + 3 = \frac{1}{2}(6 + 20)$$

$$x = 10$$



$$15 = \frac{1}{2}(4x+8+3x+1)$$

$$3 = x$$

Verify that ABCD is a trapezoid.

A(5, 1)
B(-3, -1)
C(-2, 3)
D(2, 4)

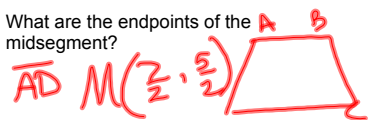
Use slope
AB
CD

$$\overline{AB} m = \frac{1}{4} \quad \overline{AD} m = -1$$

$$\overline{CD} m = \frac{1}{4} \quad \overline{BC} m = 4$$

ABCD is a trap. b/c it has one pair of // sides

What are the endpoints of the midsegment?



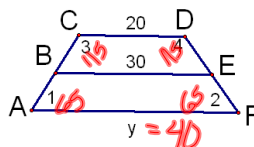
$$\overline{AD} M(\frac{7}{2}, \frac{5}{2})$$

$$\overline{CB} M(-\frac{5}{2}, 1)$$

Is it isosceles? check legs

$$AD = \sqrt{3^2 + (-3)^2} = \sqrt{18}$$

$$BC = \sqrt{(1)^2 + 4^2} = \sqrt{17} \quad \text{No}$$



Isosceles trapezoid ACDF

$$m\angle 1 = 3x + 5$$

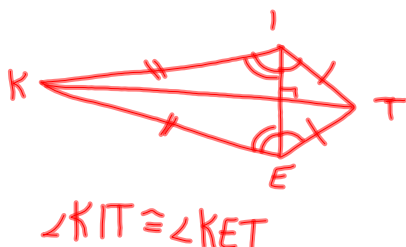
$$m\angle 3 = 6x - 5$$

$$30 = \frac{1}{2}(20 + y)$$

$$3x+5+6x-5=180$$

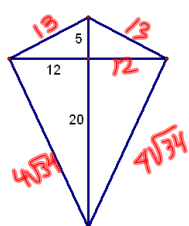
$$x=20$$

Kite--a quadrilateral that has 2 pairs of consecutive congruent sides, but opposite sides are not congruent.



Theorem 8.18--If a quadrilateral is a kite, then its diagonals are perpendicular.

Theorem 8.19--If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.

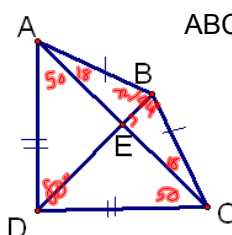


Find the lengths of the sides of the kite.

$$12^2 + 20^2 = x^2$$

$$544 = x^2$$

$$4\sqrt{34} = x$$



ABCD is a kite.

$$m\angle ADC = 80^\circ$$

$$m\angle ABC = 144^\circ$$

$$\text{Find the } m\angle DAB. = 68$$

$$\text{Find the } m\angle BAC. = 18$$

$$\text{Find the } m\angle CAD. = 50$$

HW

p546-548

5,7-15, 18-22, 25-27,
30, 32,39